FUNTIONALITY OF SOLAR OPERATED FULLY AUTOMATIC GRASS CUTTER

Achal Kedar[1], Aishwariya Parida[2], Mrunal Sirsam[3], Pranay Rahate[4], Sudhir Wanjari[5], R. B. Khule[6]
[1,2,3,4,5]Student, Department of Electronics Engineering, K.D.K.C.E, Nagpur, India
[6]Professor & HOD, Department of Electronics Engineering, K.D.K.C.E, Nagpur, India

Abstract: In present-day grass cutter machines are becoming very popular, especially which contributes less noise and air pollution. Machines and other manmade activities contribute to pollution which can be seen in our daily life.Previouslyold models of grass cutter, IC engine was in use and hence causeenvironmental pollution, noise pollution and adverse impact on one's health. Back then the IC engine driven cutter were much costly and need a lot of maintenance. To elude these drawbacks, we build solar operated fully automatic grass cutter which save electricity and reduces man power.

Keywords: Arduino Uno, Solar panels, Automatic

1.INTRODUCTION

Now a day's pollution is a major issue for whole world. The rise in pollution is contributed by humans. Previous designs and working of grass cutter created pollution and has also affected health of people. The cost and maintenance were a difficult part to handle as the IC operated and gas operated grass cutter were cost too much as it used fuels and other things and maintenance was difficult. So, the solar grass cutter is introduced. The solar operated grass cutter runs on solar to power an electric motor which rotates the blade which does the mowing and cutting of grass lawns. But the cost of grass cutters is high. So, we introduced, "The fully automated solar grass cutter" is a grass cutting robotic vehicle powered by solar energy that also avoids obstacles and is cutting the grass without the need of any human interaction. This design is alternative of all pollution creating grass cutters.

The main alteration we've attempted to make in our framework is that it worksusing Arduino Uno which is the heart of the design, not only this the sensor used relatively helps to detect the object that can stop its work and move its direction and continues its work of cutting grass.

Also, we have used solar to charge the battery instead of direct electrical supply and that's makes this design more powerful using natural resource for power.

2. LITERATURE SURVEY

2.1 Functionality of Solar Operated Fully Automatic Grass Cutter

The functionality of the grass cutter comes up with a high-speed rotational blade, that helps to cut the grass. Also, electric grass cutting machines are much simpler and a whole lot easier to be used in gardens, lawns and grass fields. The prenominal parts of the grass cutting machine are solar panel, Arduino-based charge controller, battery, dc motor for grass cutting, geared dc motor for wheels, ultrasonic obstacle sensor, etc. This system is completely automated based on solar applied in grasscutter is a fully automated grass cutting robotic vehicle powered by solar energy that also avoids obstacles and is proficient of fully automated grass cutting without the need for any human interaction. The model uses 12V batteries to turn on the vehicle and the vehicle movement motors and also the grass cutter motor. Here, we use a solar panel to charge the battery so that there is no need for charging it externally. The grasscutter and vehicle motors are confabulated to an Arduino family microcontroller that regulates the working of all the motors. Then we have Interfaced an ultrasonic device that monitors the object detection.

Here the controller does its job to move and control the direction of the vehicle that is to the forwarding direction in case if there is no obstacle

detected by sensors. On spotting the obstruction the ultrasonic sensor inspects it and the controller thus makes the prototype stop the grass cutter and turns off the blade's power supply so as to avoid any damages to the object or any living being or whatever it is. The microcontroller then turns the robotic as long as it gets

clear of the object and then moves the grass cutter in a forwarding direction again

Here we accustom our automatic grass cutting machine, a machine that performs the grass cutting operation on its own. This prototype reduces both environmental and noise pollution. Our newest design for an old and outmoded habit will help both customers and the environment. This project of a solar-powered automatic grass cutter will satisfy the consumer requirement and will lower both environmental and noise pollution. This design is meant to be an alternate green option to the popular and environmentally hazardous fuel-powered lawnmower. Ultimately, the consumer will be doing more for the environment while doing less work in their daily lives

2.2 Components Functionality

2.2.1 Solar panel: A photovoltaic panel is a packaged interconnected assembly of solar cells, also known as photovoltaic cells. The functionality of this solar panel is to provide electric energy to start the mower which was stored via sunlight

Fig 2.5 Solar panelFig 2.5 Solar panel
Fig 2.1 Solar panel

2.2.2Battery:

The batteries are used as a storage device for solar energy which can be further converted into electrical energy

2.2.3:Arduino Nano:

Fig 2.3 Arduino Nano

Arduino nano is used for controlling all parts of the automatic grass cutter robot. This is another type of controller which is small in size as well as weight and it works on the 5-12volt dc power supply. So, we have used this controller for this robot.

2.2.4:Motor driver Module L289N:

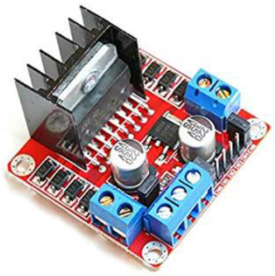


Fig 2.4 Motor driver module (L298N)

The figure shows the actual motor driver module for the gear motor. This motor driver module is useful to help the Arduino nano to control the direction of the motor and the motor works on the 12volt dc and the voltage is counted by this motor driver module. In this module, L298N IC is connected which can control the motors. The Arduino nano gives the PWM signal to the driver module and according to those signal the motors start working

2.2.5:Gear motor (100rpm)

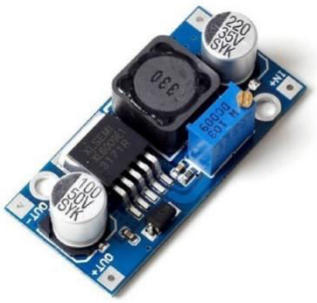
Fig 2.5 Gear Motor

2.2.6:Ultrasonic sensor

Fig. 2.6 Ultrasonic Sensor

The above figure shows the model design of the ultrasonic sensor. This sensor is used to find the object in front of the robot. It works on 5volt dc. And it has a range of 400cm.This sensor has better performance as compared with the IR sensor

2.2.7:Buck boost converter



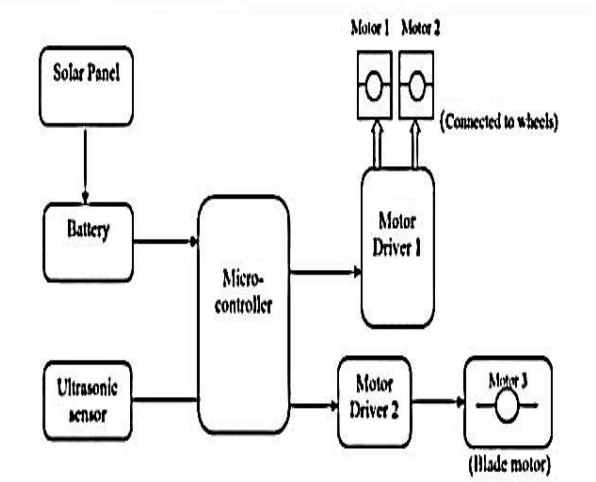
This is a buck-boost converter use for the equalization of the power coming from the solar panels. And it also safeguards the battery from the larger voltage and current.

2.2.8:Regulator IC 7805

Fig. 2.8 regulator IC 7805

The regulator IC 7805 is signed for the intent of the conversion of the voltage to 5volt. We have some devices that work on the 5volt power supply. This transmogrify is done with the help of the 78xx series IC called 7805

Block Diagram:



Advantages:

- Eco-friendly System.
- Compact size and movable.
- Unskilled person can operate this grass cutter.
- Running cost is less.
- No fuel cost
- No pollution
- Less wear and tear

Applications:

- To cut the lawn in playground.
- To cut the unwanted grass garden.
- Agricultural purpose

Conclusion

We have studied and acknowledged functionality of solar power grass cutter and various type of solar positioned grass cutters and those have contrasting approaches, methodology, functionality and operation but those projects need more efficiency and the robot dependency and it totally work automatically without any human involve

References:

- Surendra S. and Vanitha P., Smart Lawn Mower for Grass Trimming, International Journal of Science and Research, Vol.3, 2014 ,2319-7064
- E. Naresh, Boss Babuand G. Rahul, Grass Cutting Machine By Solar Power, International Journaland Magazine of Engineering technology, Management and Research, Vol.3.
- Vicky Jain, Sagar Patil, Prashant Bagane , Prof. Mrs S. S. Patil, Solar Based Wireless Grass Cutter, International Journal of Science , Technology and Engineering.
- Ms. Yogita D. Ambekar1 , Mr. Abhishek U.Ghate2 "SOLAR BASED GRASS CUTTER", International Journal of Electrical and Electronic Engineers (IJEEE) Volume 9, Issue 1, June 2017
- O. A. Tanimola, Diabana, P. D, Bankole, Y. O., "Design and Development of a Solar Powered Lawn Mower," International Journal of Scientific & Engineering Research, vol. 5, no. 6, 2014, doi: https://www.ijser.org/researchpaper/DESIGN-ANDDEVELOPMENT-OF-A-SOLAR-POWERED-LAWN-MOWER.pdf.
- R. V. Sanjana Arunesh, Shreyas Arunesh, Nivetha N., "Design and Implementation of Automatic Lawn Cutter," IJSTE - International Journal of Science Technology & Engineering, vol. 2, no. 11, 2016, doi:http://www.ijste.org/articles/IJSTEV2I11065.pdf.